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justly so, for the simplest forms would be the slowest or least likely to vary, while the most complex, from their extended relationships, would be most liable to variation. Perhaps, however, the simplest forms of life, of the same species, may have originated independently of one another, not only in different places, but also at different times, and may yet continue to do so. While the highest forms of life may have been slowly evolved from the simplest forms of the remotest age, equally simple forms may have started into existence at all times down to the present period. From the later original forms new ones may have been evolved to speed towards the same goal as those which preceded them.

NOTES.

IN an article in the "North American Review" entitled "Exact Science in America," Mr. Simon Newcomb concludes that "we are a generation behind the age in nearly every branch of exact science." He attributes this to the want of effective organization and incentive rather than to our lack of zeal in developing the material resources of the country. This statement also applies in a measure to biological science. How far the state and national geological and biological surveys have served, instead of any more direct and effective means of organizing scientific efforts, would be an interesting inquiry. As it is, the national and several state geological surveys have been almost the only means of educating students in science, of bringing to a focus the labors of scattered scientists, and of placing before the people the results of the examinations with more or less care of the geology and natural productions of our states and territories. Look, for example, at the Geological Survey of the state of New York. By the wisdom and liberality of the legislature of that state, a series of volumes on the geology, agriculture, palæontology, zoology and botany of that commonwealth have been issued, which have altogether immensely advanced these sciences in this country and assured European naturalists that in native ability and power of observation and of producing useful results from abstruse knowledge the American is not behind his trans-Atlantic brother in science. That survey also called in the aid of some eminent European naturalists, established a large museum, one of the finest in the world, and a body of assistants who have formed a coterie or school of observers, which have done and are doing much to elevate the standard

of pure science in our country. The Coast Survey in like manner, and the survey of the Territories, have built up centres of science and gathered at Washington a number of scientists, which have made that city second to no other scientific centre in the United States, and developed the energies and collected the results from observers scattered over the country. The direct influence of surveys, geodetic, geographical, and geological, in developing our science is most apparent. Certainly our colleges and universities thus far have not proved to be centres for the advancement of science; they tend to act rather as conservators of knowledge. Exception should of course be made for Harvard and Yale.

It is not to be overlooked that some of the most talented observers are not connected with any college or survey, and science has been largely indebted to isolated students for her most valuable discoveries. But it is to state and government surveys that America is on the whole most indebted for her present scientific position; in other words to *grants of money and incentives to work from the people*. It is for this reason that the proposal on the part of a number of the scientific citizens of the state of Massachusetts, who lately had a hearing before the State Committee on Education in regard to a re-survey of the topography, geology and biology of the state, will we hope, meet with favorable action on the part of the legislature this winter. By the annual appropriation of \$20,000 for a period of fifteen years, a careful, elaborate and most useful survey of that small state can be made. No survey has been made for nearly forty years. The value of the brief and incomplete reports published by the state, about forty years since, *i. e.* the botanical works of Mr. G. B. Emerson, Gould's "Invertebrates of Massachusetts," Storer's "Fishes of Massachusetts, and Harris' "Treatise on the Injurious Insects of the State," — the value of these, not to speak of the other excellent reports, as educational works, in making students of science, in assisting state teachers and in aiding farmers and gardeners in combating injurious insects, cannot be overestimated.

So valuable have these works been considered, that the state reprinted those of Drs. Gould and Harris at a cost of \$20,000. Every motive of state pride and economy calls for a thorough and final survey of the state, with reports on all departments of science, botanical and zoological as well as geological and topographical. Several other states, as Pennsylvania, Kentucky, North

Carolina and others, are making re-surveys. Such a survey, comprehensive and thorough, embracing biology as well as physical geography and geology, can be done much cheaper than many may think. The work can be accomplished as in the past, largely by naturalists and students without pay. Many monographs on groups of animals and plants, private geological explorations and the coast survey triangulations already made can be worked in without cost. The final reports can be sold at cost, and thus repay the original outlay in printing them. Those of some states have already more than repaid the cost of publication. It is to be hoped that the biological side of the survey will be fully attended to. There is a pressing need among our agriculturists of a knowledge of our parasitic plants and injurious animals.

The amount of produce annually raised in the United States is \$2,500,000,000. It is estimated that we lose one-fifth of this amount, or \$500,000,000, from the attacks of injurious plants and animals. Of this amount certainly one-tenth, or \$50,000,000 could be saved with a proper knowledge on the part of our agriculturists of the forms and habits of the injurious species. In one year it is said that in the Eastern counties of Massachusetts the farmers lost \$250,000 worth of grass from the attacks of the army worm. In 1871, in Essex County alone, \$10,000 worth of onions were destroyed by a minute insect; a loss that a slight knowledge might readily have prevented. We need state aid in affording the means of importing and raising certain parasitic insects which prey on the injurious forms. In a money point of view the natural history side of the proposed survey is fully as important as the geological or topographical.

Moreover the biological department of the survey could be carried on at a slight expense compared with the topographical and geological; and the reports, if properly illustrated and containing notes on the modes of living of injurious plants and animals, would, we doubt not, fully repay the original cost of printing.

THE attempt to colonize the bay of San Francisco with lobsters seems to have met with success. Of a hundred large female lobsters with eggs sent in June, 1873, from the eastern states, seven survived, and were placed in the bay. Fifteen or twenty young were lately caught by a Chinese fisherman while casting his net for shrimp.

A RECORD of works on geology, mineralogy and paleontology, British and foreign, will be issued by the middle of 1875, to contain short abstracts or notices of papers, books and maps published in 1874. The first volume will contain from 200 to 300 pages. Price 10s., 6d. Subscriptions should be sent to the Editor of "Nature," care of Macmillan & Co., New York.

A SOCIETY of Natural Science has lately been organized in Poughkeepsie, N. Y., with the following officers, — President, C. Van Brunt; Vice President, W. G. Stevenson, M. D.; Secretary, W. R. Gerard; Treasurer, C. F. Arnold.

DR. J. H. SLACK, of New Jersey, well known as a naturalist and pisciculturist, died August 24. He wrote on Egyptian antiquities and the mammals.

FRANCIS WALKER, the entomologist, died Oct. 5.

BOOKS RECEIVED.

- Tidsskrift for Populære Fremtillinger af Naturvidenskaben.* Kjobenhavn, 1874. Forste bind, fjerde haeite. pp. 249-320. 8vo.
- Recent Changes of Level on the Coast of Maine.* By N. S. Shaler. *Memoirs Boston Soc. Nat. Hist.* 1874. Vol. ii. Part iii. No. iii. With cuts. pp. 321-340. 4to.
- Philosophical Transactions of the Royal Society of London.* 1872. Vol. 162. Part ii. pp. 241-501. and 1873. Vol. 163. Parts i and ii. pp. 662. Illustrated. 4to.
- Proceedings of the Royal Society.* 1872-1873 and 1874. Nos. 133-150. With cuts, 8vo.
- List of Fellows of the Royal Society for 1872 and 1873.* pp. 32 and 32. 4to.
- Jenatsche Zeitschrift fur Naturwissenschaft.* Jena, 1874. New Series. Vol. i. No. 1. With illustrations. pp. 176. 8vo.
- Memoires de l'Academie de Dijon.* Dijon, 1871. 2e Serie. Tome xvi, 1870. pp. 367. 8vo. 3e Serie. Tome Ier, 1871, 1873. pp. 112.
- Bulletin Mensuel de la Societe d'Acclimatation.* Paris. 3e Serie, Tome i, 5, 6. Mai, Juin, 1874. pp. 257-432. 8vo.
- Overstigt over det Kongelige Danske Videnskabernes Selskabs.* Copenhagen, 1873. No. 3, 1874. No. 1. 8vo.
- Berliner Entomologische Zeitschrift.* Berlin, 1874. Tafel 1. Seite 1-8, 241-448. With illustration. 8vo.
- Verhandlungen der Naturforschenden Gesellschaft.* Basel, 1874. Sechster theil. Erstes Heft. Illustrated. pp. 215. 8vo.
- Transactions of the Edinburgh Geological Society,* 1874. Vol. ii. Part iii. With plates. pp. 247-434. 8vo.
- Report of Progress for 1872-73. Geological Survey of Canada.* Dawson Brothers, Publisher, Montreal, 1873. With plates. pp. 300. 8vo.
- Zeitschrift fur Gesammten Naturwissenschaften.* Berlin, 1874. Bd. ix. With cuts. pp. 568. 8vo.
- The Journal of the Linnean Society.* London, Zoology. Nos. 41-57. Botany, Vol. xii, and Nos. 49-56, 65-76. 8vo.
- Report upon Ornithological Specimens.* By Dr. H. C. Yarrow. 1871, 72, 73. Engineer Department, U. S. Army, Washington, D. C. pp. 148. 8vo.
- Catalogue of Plants.* By S. Watson, Engineer Department of U. S. A., Washington, D. C. pp. 62. 8vo.
- The Ornamental and Useful Plants of Maine.* By F. Lamson Scribner, Augusta, 1875. With plates. pp. 83. 8vo.
- Twenty-Sixth Annual Report on the New York State Museum of Natural History.* Albany, 1874. With cuts. pp. 192. 8vo.
- Description of a New Species of Calocampa.* By J. A. Lintner, Albany. 1874. pp. 2. 8vo.
- On the occurrence of Tupata Elliotti, Waterhouse, in the Satpura Hills, Central Provinces.* By V. Ball, 1874.
- On an ancient Perforated Stone found in the Satpura Hills.* By V. Ball. Illustrated. pp. 3. 8vo.
- On Habits of Some American Birds.* By Thos. G. Gentry. 1874. pp. 96-110. 8vo.
- The Monthly Microscopical Journal.* London, 1874. No. lxxi. pp. 209-260. 8vo.
- Remarks on North American Noctuidæ with description of New Species.* By Aug. R. Grote. September, 1874. pp. 10, 8vo. Received Nov. 14, 1874.